THE CLAIMS

1. (Previously Presented) A receiver comprising:

a bank of correlators for receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion; and

a correlation shaper operating on a vector output from the bank of correlators wherein

the bank of correlators generate a first vector output and the correlation shaper transforms the first vector output into a second vector output;

the second vector output is substantially uncorrelated on at least a subspace; and

the transformation substantially minimizes a mean-squared-error relationship between the second vector output and first vector output.

2. (Original) The receiver of claim **1**, wherein the bank of correlators is a decorrelator receiver.

3. (Original) The receiver of claim **1**, wherein the bank of correlators is a matched filter receiver.

4. (Currently Amended) The receiver of claim **1**, wherein the correlation shaper ~~is~~ performs a whitening transformation.

5. (Previously Presented) The receiver of claim **4**, wherein the whitening transformation is determined by minimizing the mean squared error between the first vector output from the bank of correlators and the second output vector.

6-8. (Cancelled)

9. (Currently Amended) The receiver of claim **1**, wherein the correlation shaper ~~is~~ performs a subspace whitening transformation.

10. (Previously Presented) The receiver of claim **9**, wherein the subspace whitening transformation is determined by minimizing the mean squared error between the first vector output from the bank of correlators and the second output vector.

11. (Previously Presented) The receiver of claim **1,** wherein the transformation is performed on a subspace.

12. (Previously Presented) The receiver of claim **1,** wherein the correlation shaper is chosen so that a covariance matrix of the second output vector in the space in which it lies has the property that the second and subsequent rows are permutations of the first row.

13. (Cancelled)

14. (Currently Amended) A receiver comprising:

a bank of correlators for receiving a received signal that is a linear combination of a set of non-orthonormal signature signals that has undergone some distortion; and

a set of correlating signals; wherein

the bank of correlators cross-correlates the received signal with ~~a~~ the set of correlating signals to produce a vector output, and ~~wherein~~

the set of correlating signals is orthogonal and is determined by minimizing the least-squares error between the set of correlating signals and the set of signature signals.

15. (Cancelled)

16. (Currently Amended) ~~The receiver of claim **15,** wherein the set of orthogonal signals is determined by minimizing the least-squares error between the set of orthogonal signals and a set of decorrelator signals~~ A receiver comprising:

a bank of correlators for receiving a received signal that is a linear combination of a set of non-orthonormal signature signals that has undergone some distortion; and

a set of correlating signals; wherein

the bank of correlators cross-correlates the received signal with the set of correlating signals to produce a vector output, and

the set of correlating signals is orthogonal and is determined by minimizing the least-squares error between the set of correlating signals and a set of decorrelator signals $v_m(t)$ corresponding to $\mathbf{V} = \mathbf{S}(\mathbf{S}^*\mathbf{S})^{-1}$ where **S** is the matrix corresponding to the signature signals.

17. (Currently Amended) ~~The receiver of claim **14,** wherein~~ A receiver comprising:

a bank of correlators for receiving a received signal that is a linear combination of a set of

signature signals that has undergone some distortion; and

a set of correlating signals; wherein

the bank of correlators cross-correlates the received signal with the set of correlating signals to produce a vector output, and

the set of correlating signals is a set of geometrically uniform signals and is determined by minimizing the least-squares error between the set of correlating signals and the set of signature signals.

18-19. (Cancelled)

20. (Currently Amended) The receiver of claim **14**, wherein the set of correlating signals is a set of projected orthogonal signals.

21-22. (Cancelled)

23. (Currently Amended) The receiver of claim [[**14**]] **17**, wherein the set of correlating signals is a set of projected geometrically uniform signals.

24-25. (Cancelled)

26. (Original) The receiver of claim **1**, further comprising a bank of detectors operating on the output from the correlation shaper.

27. (Previously Presented) A method for processing signals in a multi-signature system comprising the steps of:

receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion;

processing the received signal with a bank of correlators to obtain a first vector output; and

shaping the correlation of the first vector output to transform the first vector output to a second vector output, the second vector output being substantially uncorrelated on at least a subspace; and

the transformation substantially minimizing a mean-squared-error relationship between the second vector output and first vector output.

28. (Previously Presented) The method of claim **27**, wherein shaping the correlation of the vector output comprises the step of performing a whitening transformation on the first vector output.

29-32. (Cancelled)

33. (Previously Presented) The method of claim **27**, wherein shaping the correlation of the vector output comprises the step of performing a subspace whitening transformation on the first vector output.

34. (Cancelled)

35. (Currently Amended) The method of claim **27**, wherein shaping the correlation of the first vector output comprises the step of performing a transformation of the first vector output such that the covariance matrix of the ~~first~~ second output vector of the transformation on the space in which it lies has the property that the second and each subsequent row is a permutation of the first.

36. (Cancelled)

37. (Currently Amended) A method for processing signals in a multi-signature system comprising the steps of:

receiving a signal that is a linear combination of a set of non-orthonormal signature signals that has undergone some distortion;

cross-correlating the received signals with a set of correlating signals; and

determining the set of correlating signals by requiring the correlating signals to be orthogonal and minimizing a least-squares-error between the signature signals and the set of correlating signals.

38-39. (Cancelled)

40. (Currently Amended) ~~The method of claim **37**, wherein the set of signals is a set of geometrically uniform signals~~ A method for processing signals in a multi-signature system comprising the steps of:

receiving a signal that is a linear combination of a set of signature signals that has

undergone some distortion;

cross-correlating the received signals with a set of correlating signals; and

determining the set of correlating signals by requiring the correlating signals to be geometrically uniform and minimizing a least-squares-error between the signature signals and the set of correlating signals.

41. (Cancelled)

42. (Currently Amended) ~~The method of claim **40**, further comprising the step of minimizing the least-squares-error between the set of geometrically uniform signals and a set of decorrelator signals~~ A method for processing signals in a multi-signature system comprising the steps of:

receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion;

cross-correlating the received signals with a set of correlating signals; and

determining the set of correlating signals by requiring the correlating signals to be orthogonal and minimizing a least-squares-error between the set of correlating signals and a set of decorrelator signals $v_m(t)$ corresponding to $\mathbf{V} = \mathbf{S}(\mathbf{S}^*\mathbf{S})^{-1}$ where **S** is the matrix corresponding to the signature signals.

43. (Currently Amended) The method of claim **37,** wherein the set of correlating signals is a set of projected orthogonal signals.

44-45. (Cancelled)

46. (Currently Amended) The method of claim [[**37**]] **40**, wherein the set of signals is a set of projected geometrically uniform signals.

47-48. (Cancelled)

49. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = (\mathbf{S}^*\mathbf{S})^{-1/2}.$$

50. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = ((\mathbf{S}^*\mathbf{S})^{1/2})^{\dagger}.$$

51. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = (\mathbf{S}^*\mathbf{S})^{1/2}.$$

52. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = \mathbf{SFD}(\mathbf{DF}^*\mathbf{S}^*\mathbf{SFD})^{-1/2}\mathbf{DF}^*.$$

53. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = \mathbf{SFD}((\mathbf{DF}^*\mathbf{S}^*\mathbf{SFD})^{1/2})^{\dagger}\mathbf{DF}^*.$$

54. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = \mathbf{VFD}(\mathbf{DF}^*\mathbf{V}^*\mathbf{VFD})^{-1/2}\mathbf{DF}^*.$$

55. (New) The receiver of claim **1**, wherein the transformation is given by

$$\mathbf{W} = \mathbf{VFD}((\mathbf{DF}^*\mathbf{V}^*\mathbf{VFD})^{1/2})^{\dagger}\mathbf{DF}^*.$$